Mixed Volume and Surface Area Problems

(a)	(b)	(c)	(d)
The surface area of a sphere with radius $10\ cm$ is equal to the curved surface area of a cylinder with the same radius as the sphere and height $h\ cm$. Find the height h. $h = 20\ cm$	A cylinder with height $h\ cm$ and radius $6\ cm$ has the same volume as a sphere with radius $9\ cm$. Find the value of h. $h = 27\ cm$	A metal cylinder is to be melted down and turned into spheres with radius $3\ cm$. The cylinder has a radius of $12\ cm$ and a height of $25\ cm$. How many whole spheres can be made? $100\ spheres$	A cone with slanted height $25\ cm$ and radius $8\ cm$ has the same curved surface area as a hemisphere. Find the radius r of the hemisphere. $r = 10\ cm$

(e)	(f)	(g)	(h)
A cylinder has a radius r and height $15r$. A sphere has radius $3r$. Find the ratio of the volume of the sphere to the volume of the cylinder in its simplest form. $12 : 5$	A hemisphere with radius $2r$ has the same total surface area as a cylinder with radius r. Find the height of the cylinder in terms of r. $h = 5r$	A cone has a radius of $\frac{3}{2}x$ and a height of $3x$. A sphere has a radius of kx. The ratio of the volume of the cone to the volume of the sphere is $4 : 1$. Find the value of k as a fraction in its simplest form. $k = \dfrac{3}{4}$	A hemisphere of radius $(r+2)$ is attached to the base of a cone with radius $(r+2)$ and slant height $5r$. The total surface area of the compound shape is 273π. Find the volume of the compound shape. $r = 5$ $V = \dfrac{1862\pi}{3}$